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By SIR LAUDER BRUN

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# THE EFFECT OF TOBACCO IN HEALTH AND DISEASE.

ON THE HEART AND CIRCULATION.

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THE active principle of tobacco is nicotine, which has a very powerful influence upon the blood pressure and cardiac action. Both in frogs and mammals nicotine produces, first, convulsions and then paralysis. When applied in small doses to the frog's heart it causes the beats at first to become slow and afterwards to become quick. If the dose be large, no primary slowing may be observed. In animals it causes slowing of the heart with enormous rise of blood pressure. The rise of blood pressure is so great that I have never seen it equalled after the injection of any drug, with the exception of suprarenal extract. The rise of pressure is chiefly due to contraction of the arterioles. This contraction is partly dependent upon stimulation of the vaso-motor centre in the medulla oblongata, but partly also to a local action upon the arterioles themselves, as it is produced by injection of the drug even after the medulla has been destroyed. The pulse rate in mammals is first slowed and afterwards quickened, just as in the frog. The slowing is due partly to stimulation of the vagus centre in the medulla oblongata, and partly to the stimulation of the inhibitory ganglia in the heart itself. The subsequent increase in the pulse rate is due to paralysis of these ganglia. In consequence of this double action of nicotine, when the vagus is divided during the period of slow pulse, the pulse becomes somewhat quicker, but still remains slower than normal. When, however, the dose has been sufficiently large to quicken the pulse, no stimulation of the vagus will slow the heart, as the inhibitory ganglia in the heart, through which the vagus acts, are paralysed by the nicotine. This action is the same in the heart of the frog, so

that, after a large dose of nicotine, stimulation of the vagus has no effect upon the heart, but stimulation of the venous sinus itself will slow the heart. The reason of this is, that although the inhibitory ganglia in the heart are paralysed, the inhibitory neurons, which proceed from them, are still intact and are affected by local stimulation.


Formerly, tobacco enemata were used as a means of causing vascular and general relaxation, but they were far from being without danger, and are never employed now. But, although tobacco is not used as a remedy for disease, its employment is so universal that its action requires very careful consideration. Nicotine alone is only taken into the body when tobacco is used by chewing or by snuffing. When it is chewed most of the juice is expectorated, but a small portion is probably swallowed. When tobacco is used in the form of snuff small quantities of it find their way into the naso-pharynx and they are swallowed. The tobacco used for chewing or snuffing contains, as a rule, but very little nicotine, and so symptoms of poisoning from either of those habits are rare. Usually however, tobacco is employed for smoking either in the form of cigars or cigarettes, or in a pipe. When used in any one of these forms it is not pure nicotine which reaches the mouth, but really the products of the dry distillation of tobacco, containing a large quantity of pyridine and picoline bases. Probably nicotine in greater or less quantity may be present. The proportions of the pyridine and picoline bases in the smoke vary according to the mode in which tobacco is burnt. In a cigar there is freer access of air, so that much collidine and little pyridine are formed, while in a pipe much more pyridine is produced and thus stronger tobacco can be smoked in a cigar than in a pipe. So much is this the case that tobacco which, in the form of a cigar would produce no disagreeable effect, may cause giddiness and vomiting if smoked in a pipe. The smoke from a pipe or cigar usually passes simply into the mouth and out again either through the mouth or the nostrils, but when smoked in a huqa or narghileh the smoke is inhaled into the lungs, and this is frequently done also by people who smoke cigarettes. When a huqa or a narghileh is used the smoke passes through water before being inhaled, and it is thus deprived of most



of its poisonous constituents, but this is not so with the smoke of cigarettes, and, as absorption occurs very rapidly from the pulmonary mucous membrane, cigarette smoking is sometimes very injurious. There is another reason, however, why cigarette smoking is frequently more harmful than smoking a pipe or cigar, and it is that cigarettes are small and can be smoked in a few minutes, so that many more are consumed in the course of the day than would correspond to pipes or cigars, and the total quantity of tobacco used is thus greater in the form of cigarettes.

Smoking, in moderation, does not seem to be injurious to grown-up people, but there appears to be a general consensus of opinion that it is very distinctly harmful to growing lads. In adults, smoking appears to have a double action. It will stimulate the brain to increased activity and it will also produce a soothing effect in conditions of excitement. Its stimulating effect upon mental activity is probably partly due to the local irritant action of smoke upon the mouth causing reflex dilatation of the vessels which supply the brain. Its action as a sedative is probably partly due to the necessity of breathing rhythmically while smoking, and to the soothing effect of watching the smoke as it issues from the lips or nostrils, especially when it is blown out in the form of rings. This is by no means an unimportant factor, for many people derive but very little pleasure from smoking in the dark.

One of the commonest results of excessive smoking is chronic pharyngitis, with irritability of the throat, cough, and hoarseness, and sometimes the irritation also affects the tongue. Weakness of vision, nervous tremor, and giddiness are frequently the result of tobacco smoking. It is difficult to decide how far these are due to the direct action of the tobacco smoke upon the nervous system and how far they are caused through alteration in the circulation. The circulation becomes much affected, palpitation and pain in the cardiac region are common results. Sometimes, though rarely, the cardiac pain may be so great as to simulate angina pectoris. Irregularity of the heart is very common, and it appears to me that this irregularity is more frequently found from a common kind of tobacco known as "pigtail" than from better class tobaccos. When I was a house physician, I met with it very

frequently, and the cardiac rhythm might be represented in this way , a pause followed by one or two heavy beats, then a succession of quick and small beats, and then a pause again. With better class tobaccos I have not observed this irregularity so frequently, but I have more often seen the patient simply fall down unconscious as if he had been shot. These unpleasant symptoms, as well as the nervous symptoms which accompany them, may sometimes cease upon lessening the amount of tobacco used, but not unfrequently a very small quantity appears to keep up the condition after it has once been established, and complete abstinence from tobacco, occasionally for a period of several months, is required before it can be resumed without causing a recurrence of the symptoms.









